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By the work of Pütter another of the reactions of these organisms — thigmotaxis — is placed on a satisfactory scientific basis, and light is thrown on many other phenomena.

H. S. J.

Notes. — Burchardt's recent article (*Jenaische Zeitschrift*, Bd. XXXIV, pp. 719–882) on the body spaces and connective tissue of *Amphioxus* is of general interest because of the accompanying bibliography, which is intended to be complete for this important and much studied animal. The list is arranged chronologically and includes some six hundred references. One is reminded of Baedeker on finding that important papers are indicated by an asterisk.

Metcalf ("Notes on the Morphology of the Tunicata," *Zoologische Jahrbücher*, Bd. XIII, 1900, pp. 495–602, Heft IV) gives us a paper extending over a wide range of morphological and systematic topics. A brief notice like the present one cannot mention all the results of interest contained in such a paper as this. Among them the following are perhaps the most important: The homology of the vertebrate hypophysis and the neural gland of the Tunicata is a "suggestion the truth of which, while it may be probable, is still insufficiently established." Reëxamination of the structure of the interesting deep-sea genus *Octacnemus* leads to the conclusion that its affinities are with those simple ascidians that reproduce by budding, rather than with the Salpidae, as supposed by Herdeman. It is proposed to institute a family, the Octacnemidæ, for it. A new species of the molguloid genus *Bostrichobranchus*, viz., *B. molguloides*, is described.

A contribution to the postembryonal development of Molgula is made by Marc de Selys-Longchamps and D. Damas (*Arch. de Biologie*, Tome XVII, 1900, pp. 385–483). The development of the stigmata is studied with special care. Six pairs of protostigmata are recognized, the first two pairs forming simultaneously. The later multiplication and coiling up of the stigmata and the formation of the infundibulæ are followed out. The larval sense organ is found to persist into adult life in *M. ampulloides*. The study of the development of the sexual glands leads to the conclusion that there is no bilateral symmetry in the disposition of the germinative epithelium.

In studies on some distomes, Jacoby describes (*Arch. f. Naturges.*, Bd. I, 1900) a species, *Distomum heterolecithodes* Braun, which is remarkable for the fact that the vitelline gland, which is usually symmetrical, is developed only on one side of the body. In eleven cases studied the organ was sinistral, while in four the author found

a complete *situs inversus*, or, as Kowalewski has termed it, sexual amphitypy, in which the arrangement of organs is the mirror image of the normal condition. The same anomaly was found to occur in the following species in the ratio given: *Opisthorchis crassiuscula* (Rud.) 7 : 84, *O. poturzyensis* (Kow.) rarely; *O. albida* 16 : 68, *O. truncata* (Rud.) 6 : 50, *O. felinea* (Riv.) 8 : 100. Other cases from other species have been recorded by Stiles and Hassall, and Kowalewski regards it as a characteristic of the genus *Opisthorchis*. If this be true, it must still be remembered that it may occur in other genera also. Jacoby observed it in *Distomum lanceolatum*, which is not related to *Opisthorchis* but rather perhaps to *D. heterolecithodes*.

The nervous system of *Moniezia expansa* has been studied by Tower (*Zool. Jahrb.*, Abt. Morph., Bd. XII, pp. 359-384, 6 pls.). It is noteworthy that the physiological salt solution, so universally used, is harmful if the worms remain in it more than an hour. The author gives the formulæ of fluids successfully employed for transporting the cestodes, for keeping them alive in the laboratory even up to five days, and for fixing and staining the nervous tissues. In the scolex is present an anterior nerve ring with four small ganglia opposite the suckers, a pair of large cephalic ganglia connected with the ganglia of the anterior ring by four nerves and surrounded by the posterior ring which connects with the lateral lobes of the cephalic ganglia, and also by four small nerves with the ganglia of the anterior ring. These latter nerves are the beginning of the dorsal and ventral longitudinal nerves, while the prominent lateral nerves spring from the lateral lobes of the cephalic ganglia. No accessory lateral nerves were present. In each proglottid each lateral nerve bears an anterior lateral ganglion near the center and a posterior lateral ganglion near the posterior margin. From the former a transverse genital nerve arises, and from the latter a bunch of smaller fibers, together with a marginal nerve, which is recurrent, and the dorsal and ventral commisures which together constitute the nerve ring of each proglottid.

The Uncinariæ of the Canidæ and Felidæ and the Sclerostominae of the Ruminants have been subject to a careful revision by Railliet (*Arch. Parasitol.*, Tome III, No. 1, 1900).

The distomes of the isolated genus *Rhopalias* St. and H. (*Rhopalophorus* Dies) have been restudied from Rudophi's and Diesing's types by Braun (*Zool. Anzeiger*, Bd. XXIII, pp. 27-29). Three species are reported, of which one is new, and the genus appears to be confined to the marsupials of South America. These forms are closely

related to the echinostomes, but the lateral lobes of the head, which are supplied with spines, have been transformed into a retractile proboscis.

An Atlantic "Palolo" is described by Mayer (*Bull. Mus. Comp. Zool.*, Vol. XXXVI, pp. 1-14, 3 pls.). The form, which is shown to be distinct from the Pacific species of similar name and habits, is named *Staurocephalus gregaricus*. It appeared in a dense swarm before sunrise on a single morning and discharged its sexual products with the coming of the sun under contractions so violent that the ripe segments were torn open. The author gives an interesting discussion of the advantages of this habit in shortening the egg-laying season, concentrating the breeding individuals and not only insuring more perfect fertilization, but also reducing the distance which the sperm must traverse in order to fertilize the ova; while the increased struggle for food due to the production of a large number of young larvæ is counterbalanced by the heavily yolk-laden egg of this species.

The Alciopidæ and Tomopteridæ of the Plankton Expedition by Apstein (*Ergebnisse der Plankton-Expedition der Humboldt-Stiftung*, Bd. II, H. b., 61 pp., 14 pls.) opens with an extended taxonomic account of the alciopids captured. The geographical distribution of these forms has been much extended, as appears from the tables given, which also show that the group belongs to warmer waters, with the exception of strays found in the northern branches of the Gulf Stream and of a single Antarctic species. Within the warm zones they appear to be generally distributed without special areas and are present everywhere in approximately equal numbers, as shown by the hauls of the vertical net. Among the tomopterids, however, a single species seems to occur only in the vicinity of land, though with an extended range, while the others are all true pelagic forms. The genus contains species found in cold waters, — those characteristic of warm regions and such as inhabit both. While moderately equally distributed, these forms do not manifest the uniformity noted for the alciopids.

BOTANY.

Some Recent Forestry Publications. — The interest in the preservation of the timber covering which still characterizes certain parts of the earth, and its renewal in denuded areas, which appears to be